

Observations of the New Star in Andromeda, made at Mr. Wigglesworth's Observatory with the 15.5-inch Cooke Refractor.
By J. Gerh. Lohse.

When the intelligence of the discovery of the new star in *Andromeda* was received, it was determined to connect the star micrometrically with some neighbouring stars, to compare its brightness with that of suitable stars, and to examine the spectrum as far as the instruments might allow.

The micrometric observations were made with a micrometer kindly lent by Lord Crawford. It was constructed by Merz, possesses only one micrometer screw, and has three movable wires and a set of fixed wires. A fine movement can be given to the whole micrometer by two screws in the adapter—an arrangement which has proved very convenient.

The observations of the old nucleus and of the 11th mag. star in the nebula are given singly; in the case of the other stars, however, the final result only is given. The corrections for refraction have been applied.

Measures of the Old Nucleus from the New Star.

1885.	Pos.	Dist.
Sept. 3	76°50	16''12
4	75°46	15'73
6	*	16'59
6	77°10	16'22
6	74°80	17'24
9	75°60	16'02
29	76°30	16'48
	<u>75°96</u>	<u>16'343</u>

$$\Delta\alpha = +1^s.393$$

$$\Delta\delta = +3''.96$$

1885.	Pos.	Dist.
Nov. 30	*	15''21
	76°12	14'94
	76°24	14'95
	<u>76°18</u>	<u>15'033</u>

$$\Delta\alpha = +1^s.283$$

$$\Delta\delta = +3''.59$$

* The first settings in Pos. on Sept. 6 and Nov. 30 were rejected at the telescope.

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Measures of the 11th Mag. Star.

1885.	Pos.	Dist.
Oct. I	262°07	108''27
	262°10	109°04
	—	109°80
	262°00	108°95
	—	108°28
	—	108°20
	<hr/> 262°06	<hr/> 108°76

$$\Delta\alpha = -9^s.46$$

$$\Delta\delta = -15''.00$$

1885.	Pos.	Dist.
Nov. 30	261°58	108°67
	261°60	109°38
	<hr/> 261°59	<hr/> 109°03

$$\Delta\alpha = -9^s.48$$

$$\Delta\delta = -15''.95$$

The following table contains the estimated magnitudes of the stars, measured from the new star, the position-angles and distances, the differences of R.A. and Declination, and the date on which the observations were made.

Mag.	Pos.	Dist.	$\Delta\alpha$	$\Delta\delta$	Date.
10	294° 4'97	382''82	— 30°72 ^s	+ 156''21	1885. Oct. 6
13	252 28°55	223°98	— 18°76	— 67°44	Oct. 1
10.2	345 11°78	439°53	— 9°88	+ 424°93	Oct. 1, 5, 26
11	341 31°08	292°32	— 8°14	+ 277°24	Oct. 1, Nov. 30
12.8	351 40°97	323°53	— 4°11	+ 320°12	Oct. 26
11.4	354 42°10	429°69	— 3°49	+ 427°86	Oct. 5
11.4	355 49°30	373°39	— 2°39	+ 372°39	Oct. 5
11.6	171 45°33	154°20	+ 1°94	— 152°62	Oct. 1, Dec. 1
11	156 46°20	230°28	+ 7°98	— 211°60	Oct. 1, Nov. 30
9.7			+ 55°52	+ 390°16	Oct. 29
11			+ 85°73	+ 248°98	Oct. 29
9			+ 123°24	+ 168°42	Sept. 4
10			+ 202°60	+ 397°49	Oct. 29

The other observations are given in chronological order :—

Sept. 3.—The spectrum is continuous, no lines could be distinguished in it with the Browning and McClean spectroscopes. The bright C line was very well seen in γ *Cassiopeiae*.

The new star is one magnitude larger than the two 9th mag.

stars north of M 32, but fainter than the stars B.-W.₂, $0^h.1057$ and $0^h.1062-3$.

Sept. 6.—The colour of the new star is yellow like that of several Bessel-Weisse stars in the neighbourhood, viz. B.-W.₂, $0^h.896$, $0^h.953$, $0^h.965$, $0^h.1062$. The star is of the same brightness as B.-W.₂, $0^h.953$, if anything a little brighter.

With a view to ascertain whether the appearance of the new star had produced a sensible alteration in the nebula, a small piece of paper was stuck to the field lens of a positive eyepiece, and the image of the new star placed behind it. The glare of the bright star being thus eliminated, the nebula, with the exception of the immediate neighbourhood of the new star, was very well seen, and appeared symmetrically arranged round the old nucleus, very much in the same way as I had known it before. Also without the use of a piece of paper on the eyepiece it was not difficult to see that the central part of the nebula is round and regularly arranged, with regard to the old nucleus as centre. The new star, therefore, as might have been expected, does not seem to have affected the form and distribution of matter in the nebula at all.

Sept. 9.—The new star in *Andromeda* is still as bright as B.-W.₂, $0^h.953$, but certainly not brighter. The colour is perhaps a little more reddish than formerly, but I am not quite certain about it. The spectrum is still continuous, but the part from F to about midway between F and G is fainter than in the spectra of neighbouring stars. In consequence of that, the spectrum near G appears comparatively brighter, but it does not seem to be brighter than the corresponding part of the spectrum of B.-W.₂, $0^h.953$, which has about the same brightness. The position of the fainter part in the spectrum depends on estimation only, there being no means for measuring the wave-length.

Sept. 12.—The new star is now decidedly fainter than B.-W.₂, $0^h.953$, and only one- or two-tenths of a magnitude brighter than the two stars north of M 32. The spectrum is continuous, and as long as that of D. M. + $40^\circ 145$, if not longer. Much attention was paid to the red end of the spectrum, and repeated comparisons of the two spectra convinced me that this part of the spectrum is quite as much developed in the new star as in D. M. + $40^\circ 145$. The observations were made with a McClean prism held in front of the eyepiece, and are only estimations.

Oct. 26.—The new star is of the same magnitude as the 10.2 mag. star in pos. $345^\circ.21$, and dist. $439''.53$.

Nov. 28.—The new star is of the same brightness as the 11 th mag. star preceding it in the nebula.

Dec. 1.—With a magnifying power of 196 the new star appears $.1$ mag. brighter than the preceding star, but with a power of 127 it appears decidedly fainter, owing to the apparent increase of brightness of the nebulosity around it.

The determinations of the distance of the old nucleus from the new star seem to possess a special interest; for the observa-

tions made on November 30 give a smaller value for this distance than any of the observations made in September. This result is partly confirmed by the observations of the 11th mag. star in the nebula, sp. of the new star. The distance found on November 30 is a little larger than that obtained on October 1, as it ought to be if the distance between the nucleus and the 11th mag. star had remained unaltered; the difference, however, in this case is not so great.

The observations of Dr. Engelmann, published in *Ast. Nach.* No. 2683 and 2704, give similar results. The earlier series gives

Nova to old nucleus	...	...	...	...	16 ["] 33
Nova to 11th mag. star	...	...	...	...	109 ["] 72

while the distances derived from later observations are

Nova to old nucleus	...	...	...	...	15 ["] 96
Nova to 11th mag. star	...	...	...	...	109 ["] 98

The difference between the measures of the old nucleus is also in this case the larger one.

Although there are great discordances even between observations made on the same night, it seems difficult to explain the differences between the earlier and later observations entirely by errors of observation. The fact that two observers altered their mode of observing at the same time and in the same direction, while observing the same objects, seems very remarkable, unless there was some real change in the objects. If we assume that the new star has a large proper motion in the direction towards the nucleus, the greater part of the discordances vanishes. Unfortunately, no more observations can be obtained, the star having disappeared in the surrounding nebulosity.

Mr. Wigglesworth's Observatory, Scarborough:
1886, March 10.

Observations of Comets *d*, 1885 (*Fabry*), and *e*, 1885 (*Barnard*), made at the Royal Observatory, Greenwich.
(Communicated by the Astronomer Royal.)

The observations were made with the East or Sheepshanks Equatorial, aperture 6·7 inches, by taking transits over two cross wires at right angles to each other, and each inclined 45° to the parallel of Declination.

Comet <i>d</i> , 1885.									
Greenwich Mean Solar Time.	Observer.	☿ — * R.A.	Corr. for Par. and Refract. in R.A.	☿ — * N.P.D.	Corr. for Par. and Refract. in N.P.D.	No. of Comp.	Apparent R.A.	Apparent N.P.D.	Comp. Star.
1886.									
March									
d									
h m s									
7 28 52	H. T.	+3 21·30	+0·31	—5 25·2	—4·1	1	23 19 41·87	58 43 15·8	<i>a</i>
7 31 33		—0 30·70	+0·24	+7 27·0	—2·5	2	23 19 44·12	58 43 20·2	<i>b</i>
7 42 4		—1 14·45	+0·33	—9 31·3	—4·6	2	23 19 39·44	58 43 8·9	<i>c</i>
Comet <i>e</i> , 1885.									
March 7 7 59 3	H. T.	—0 29·62	+0·22	+1 5·1	—3·3	5	1 54 42·04	67 10 33·8	<i>d</i>

Mean Places of Comparison Stars.

	Star's Name.	R.A. 1886 ^o .		N.P.D. 1886 ^o .		Authority.
		h	m s	°	' "	
(<i>a</i>)	64 <i>Pegasi</i>	23	16 21·07	58	48 42·6	9-year Catalogue.
(<i>b</i>)	W. B. (2) XXIII. 380	23	20 15·38	58	35 53·2	Weisse's Bessel (2).
(<i>c</i>)	Lalande 45897	23	20 54·36	58	52 42·2	Lalande.
(<i>d</i>)	Avg. Zone +22° No. 296	1	55 11·86	67	9 26·7	Rümker.

Notes.

- (*d*) Comet bright, with nucleus. (e) Not so bright as (*d*). Nucleus not well defined though suspected.
The observations are corrected for parallax and refraction. The initials H.T. are those of Mr. Turner.

Royal Observatory, Greenwich: 1886, March 12.